MISSOURI DEPARTMENT OF NATURAL RESOURCES
AIR AND LAND PROTECTION DIVISION
ENVIRONMENTAL SERVICES PROGRAM
Project Procedures

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TITLE: NPDES Compliance Monitoring Procedures

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SUMMARY OF REVISIONS: Major revisions have been made to the sampling plan and procedures to reflect changes made within the WPCP sampling requests. For example, the three day NPDES compliance monitoring request has been changed to a one day (24-hour) sampling event.

APPLICABILITY: The procedures outlined in this sampling protocol apply to ESP personnel who perform sampling to determine compliance with NPDES permit conditions.

DISTRIBUTION: MoDNR Intranet
ESP FSS Supervisor
ESP FSS SOP Coordinator
ESP WQMS Supervisor

RECERTIFICATION RECORD:

Date Reviewed				
Initials				

1.0 SCOPE AND APPLICABILITY

1.1 Environmental Services Program (ESP) personnel will sample the discharge(s) from wastewater treatment facilities that possess a valid Missouri State Operating Permit to verify compliance with the Missouri Clean Water Law, state regulations, and the operating permit. A facility's permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System (NPDES). Facilities to be sampled are outlined in the Water Pollution Control Program's (WPCP) Quality Assurance Project Plan (QAPP) for Compliance Monitoring.

1.2 Data acquired from a sampling event may be used:

- for quality assurance/quality control (QA/QC) purposes. The compliance monitoring data can be used to check the accuracy of the facility's monthly discharge monitoring reports that are submitted to the Missouri Department of Natural Resources (MDNR) regional offices.

- to support determinations of compliance with the conditions established in the Missouri Clean Water law, state regulations, the operating permit, or limitations contained in an administrative order or court order.

2.0 PERSONNEL QUALIFICATIONS

Field personnel shall have a working knowledge of the field sample collection procedures and have, at a minimum, attended either the department-sponsored inspection and enforcement training, basic sampling workshop, or received training from an ESP employee knowledgeable of the proper sample collection procedures and be familiar with all applicable standard operating procedures.

3.0 HEALTH AND SAFETY

3.1 As part of the trip preparation, field personnel shall notify their supervisor of their plans and complete an ESP vehicle trip itinerary. The itinerary shall contain information such as, name(s) of field personnel, date(s) of sampling, sampling location/facility, hotel telephone number, cellular telephone number, vehicle license plate number, etc.

3.2 Field personnel who are routinely exposed to wastewater (domestic, animal, or industrial) are encouraged to frequently wash their hands with soap and water, and protect themselves from water borne illnesses by wearing the appropriate personal protective equipment (such as clean disposable gloves and waders, if instream sampling).

3.3 Personnel should participate in medical monitoring in accordance with the MDNR Division's medical monitoring policy. All field personnel who are routinely exposed to wastewater should be familiar with the Hepatitis A Prevention vaccine

policy. Both policies can be reviewed on the MDNR's intranet home page by accessing the Health and Safety information page.

4.0 REQUEST FOR SAMPLING

4.1 Sampling requests come to the ESP Water Quality Monitoring Section (WQMS) from the Water Protection and Soil Conservation Division (WPSCD), WPCP at the beginning of each fiscal year. Copies of the NPDES permits will accompany the fiscal year sampling request list.

4.2 WQMS field personnel conduct sampling activities at the requested major wastewater facilities and minor mechanical 92-500 wastewater facilities.

4.3 The request list will be reviewed by the WQMS supervisor or designated personnel for any discrepancies, omissions, scheduling problems, or any other anticipated problems. Problems will be brought to the WPCP Project Manager's attention for resolution.

5.0 SAMPLING CONSIDERATIONS

5.1 The data collected may be used in conjunction with other findings for the purpose of enforcing the water pollution control rules and regulations. Therefore, all samples should be collected in such a manner and at such sites as to be representative of the source from which they are taken. Generally, sampling will not be done at seasonal facilities during the first two weeks of operation at the beginning of each season. Wastewater facilities having permit limits on fecal coliform bacteria should be sampled during the recreational season (April-September), if possible.

5.2 In no event should any 24-hour composite sample be collected beginning on the last day of the one month and ending on the first day of the next month. Results of samples collected under these circumstances cannot be used given the regulatory definition of "monthly average" effluent limitation.

6.0 SURVEY PREPARATION

6.1 The supervisor of the WQMS or designated personnel will establish a sampling schedule and assign personnel to each requested survey.

6.2 At least 10 working days prior to the scheduled survey, the Environmental Specialist assigned to the survey will review the sampling request and NPDES permits provided by the WPCP.

6.2.1 Any unusual or special sampling/analytical requirement(s) will be noted.

6.2.2 The Environmental Specialist shall check the permit expiration dates and, if expired, contact the WPCP Project Manager to determine if a new or updated permit has been issued. The WPCP Project Manager should be contacted if questions about the permit arise.

6.2.3 The Environmental Specialist must determine sampling dates and organize his/her trip(s) accordingly.

6.3 At least five working days prior to the survey, the Environmental Specialist will e-mail the appropriate regional office (RO) Director(s) and explain that ESP personnel are planning to conduct a sampling event within their region(s). The following information should be provided:

- ESP field member(s) involved;
- when the survey will be conducted;
- which facilities will be monitored; and
- the RO and/or the WPCP should be contacted if there are any problems/questions with the sampling request or permits.

6.4 At least five working days prior to the survey, the Environmental Specialist will e-mail the Chemical Analyses Section (CAS) of the ESP indicating when the samples will be arriving at the lab, the analyses being requested, the number of samples and how the samples will arrive (hand delivered or shipped).

6.5 Prior to the survey, the Environmental Specialist will determine the type and quantity of supplies, and equipment needed. The Environmental Specialist will check all equipment for cleanliness and operation (see MDNR-FSS-001 *Required/Recommended Containers, Volumes, Preservatives, Holding Times, and Special Sampling Considerations* and MDNR-FSS-201 *Use, Cleaning, and Maintenance of ISCO Automatic Wastewater Samplers*).

6.6 ESP personnel will arrive unannounced at the facility to be sampled during normal business hours. Prior notification will not be made unless it is necessary for timely access.

6.7 If the facility owner must receive prior notification to gain access to the facility, then the Environmental Specialist or RO employee (whoever has been chosen during prior contact) will make the notification. Contact with the facility owner should be made so it provides the minimum notification time necessary while still accomplishing the needs of the sampling effort.

6.8 A state vehicle shall be checked out prior to the survey. The Environmental Specialist will arrange for lodging, if necessary, and complete administrative functions required for travel.

7.0 SURVEY IMPLEMENTATION

7.1 Each facility requested to be sampled by the WPCP will be visited on the first day of the survey. If not all the facilities can be visited due to time constraints, priority will be established by conferring with RO personnel, if necessary.

7.1.1 Upon arriving at a facility, the person who has authority (e.g. facility owner, operator or manager) to grant permission for entry will be contacted immediately upon arrival and prior to the facility inspection by ESP personnel, unless prior contact is necessary. The Environmental Specialist will introduce his/herself, provide proper credentials, state the purpose of the visit, and gain permission to enter the property.

7.1.2 If the facility is locked and inaccessible, and a person of authority is not present at the time of arrival, the survey should not be performed without permission to enter the property from the proper authority (e.g. City).

7.1.3 However, if the person of authority is not present at the time of arrival, but the facility is unlocked and accessible, the Environmental Specialist may initiate the survey. The Environmental Specialist should then leave a note for the facility personnel stating the details of the facility survey. The Environmental Specialist should note the following information:

- name and affiliation
- phone number that the facility personnel may contact for further information
- time and date of arrival
- purpose of the survey
- expected time of sample retrieval
- parameters being collected for chemical analyses

7.1.4 If permission to enter the property is refused or if the survey is contested, the Environmental Specialist shall immediately contact his/her supervisor for determination of a course of action. The WQMS Supervisor will contact the project officer or supervisor of the Compliance/Review Section of the WPSCD WPCP to discuss a course of action.

7.2 After access to the facility has been gained, a cursory facility inspection should be conducted to determine its general condition and the nature of its discharge or effluent. Any unusual conditions that impact treatment efficiency and effluent quality should be noted and, if deemed necessary by the WQMS Supervisor, reported to the RO.

7.3 The Environmental Specialist should ask the facility personnel questions regarding the current operating conditions of the treatment facility and/or the wastewater source(s). For instance, facility personnel may state what type of manufacturing processes or treatment processes are on-line. A diligent effort should be made to obtain the information especially when sampling from complex

manufacturing wastewater treatment facilities. Any unusual operating conditions found should be noted and, if deemed necessary by the WQMS Supervisor, reported to the RO.

7.4 Sampling for compliance should be initiated when discharge from the facility is occurring and the facility is overall suitable for sampling with a mechanical sampler. The composite sampler should be securely placed at the same location where the facility routinely collects its samples (see MDNR-FSS-005 *General Sampling Considerations Including the Collection of Grab, Composite, and Modified Composite Samples from Streams and Wastewater Flows*).

7.4.1 Typically, samples will be collected as 24-hour (+/- 2 hours) composite samples unless the parameters requested are specified as "grab only" in MDNR-FSS-001.

7.4.2 Under normal circumstances, 24-hour timed-interval composite samples will be collected using an automatic wastewater sampler that collects an equal aliquot every half-hour (see MDNR-FSS-201 *Use, Cleaning and Maintenance of ISCO Automatic Wastewater Samplers*). If the discharge is of insufficient volume to use an automatic sampler, a grab sample should be collected for the targeted parameters (see MDNR-FSS-005 *General Sampling Considerations Including the Collection of Grab, Composite, and Modified Composite Samples from Streams and Wastewater Flows* and MDNR-FSS-001 *Required/Recommended Containers, Volumes, Preservatives, Holding Times, and Special Sampling Considerations*) and documented in a field notebook.

7.4.3 Conditions which may require other sampling procedures include:

- effluent in insufficient quantity to allow use of the automatic sampler.
- winter sampling conditions.
- the likelihood of sampler loss or vandalism.
- parameter(s) of interest which are not suitably collected by an automatic sampler.

Do not use the automatic sampler to collect samples for:

- dissolved gases (oxygen, etc.)
- bacteria
- oil and grease
- volatile organics
- extractable organics (unless sampler is suitably modified)
- pH
- temperature

7.5 Split samples are to be provided to the facility owner/operator upon request, if possible. The owner/operator should provide their own sample containers. However, if requested, sample containers may be provided to the owner/operator

if an adequate supply exists. It is not ESP's general practice to provide chemical preservatives or preserve a split sample for the facility since injury from mishandling could result.

8.0 FIELD ANALYSES

8.1 The analysis of pH shall be considered an in-situ analysis, that is, to be conducted in-stream or on a sample removed from the stream, analyzed immediately and then discarded. The pH results are recorded on the Field Sheet and Chain-of-Custody record (See MDNR-FSS-002 *Field Sheet and Chain-of-Custody Record* for additional information).

8.1.1 A separate sample number is not assigned to field analysis of pH, temperature, conductivity, and/or dissolved oxygen when collected to complement a composite sample. Although the field results are collected as a grab, it is assigned the same sample number as the composite sample. However, it should be noted in the field book as being performed on a separate grab collected from the effluent and not from the composite sample.

8.1.2 An exception is when a grab sample is collected (e.g. fecal coliform or oil and grease) in addition to the composite sample. In this case, the result of the field analysis is assigned the same number of the grab sample. If the field analysis is the only parameter analyzed at a sampling location, then a sample number will be assigned to it and the results written on the Field Sheet and Chain-of-Custody.

8.2 Fecal coliform samples should be representative of the water being tested. If the facility disinfects the effluent discharge (chlorination, UV light, etc.,), the fecal coliform sample should be collected following the disinfection process. The sample must then be either delivered to the ESP Laboratory and analyzed or analyzed in the field within the six-hour holding time (see MDNR-FSS-108 *Field Analysis of Fecal Coliform Bacteria*).

Note: If the facility disinfects the effluent discharge, this should be indicated on the sample label and Field Sheet and Chain-of-Custody record (See MDNR-FSS-002 *Field Sheet and Chain-of-Custody Record* and MDNR-FSS-003 *Sample Numbering and Labeling)*.

8.3 If the permit has mass loading limitations (lbs/day, kg/day, etc.) flow measurements must be collected. A flow recording device should be present at the facility's NPDES outfall. Flow measurements must be recorded at the start and conclusion of the sampling period, so that a total flow for the sample period can be calculated. The flow measurements must be recorded on the Field Sheet and Chain-of-Custody record with the appropriate flow units indicated (see MDNR-FSS-002 *Field Sheet and Chain-of-Custody Record*).

8.4 After collection, the composite sample will be transferred to the proper type and number of containers (see MDNR-FSS-001 *Required/Recommended Containers, Volumes, Preservatives, Holding Times and Special Sampling Considerations*). The composite sample must be thoroughly mixed before and during transfer to ensure a representative concentration of solids. Mixing can be achieved by carefully swirling the water sample within the composite sample container.

8.5 In conjunction with sample labeling, the sample, or portions thereof, will be preserved according to MDNR-FSS-001 *Required/Recommended Containers, Volumes, Preservatives, Holding Times and Special Sampling Considerations*.

8.6 Number the sample by attaching a pre-numbered sample label to one of the sample containers. The other sample containers associated with that sample will receive a hand-numbered label with the same sample number as the pre-numbered label. Indicate the preservation method used by circling the appropriate preservative on the label (see MDNR-FSS-003 *Sample Numbering and Labeling*).

8.7 For NPDES compliance monitoring, the following information must be recorded on the Chain-of-Custody record:

- Facility or site name (When a facility's permit requires stream sampling above and/or below the facility effluent, the sample description block should begin with the facility name rather than the stream name).
- County name
- NPDES permit number
- Details specific to the sample (e.g. effluent outfall number, influent, upstream or downstream of discharge point, etc.)
- Composite, modified or grab sample

8.8 If possible, the Environmental Specialist should observe the conditions of the receiving stream above and below the facility's discharge point at least once during the survey and document the observations in a field notebook.

8.9 Immediately enter any significant observations for each facility visit (see MDNR-FSS-004 *Field Documentation*) in the field notebook. Areas to be addressed in the field notebook include:

- date and time of each visit
- ambient weather conditions
- condition of the receiving stream
- appearance/odor of discharge
- any variations from sample collection procedure
- conditions in the facility which have obvious effects on the discharge quality
- comments made by facility personnel
- location of sampler (outfall #, at weir, at pipe, etc.)
- any sampler-induced influences on sample representativeness
- field calibration of instruments
- field measurements

8.10 At the end of each day's work, review all documents to include field notes and Chain-of-Custody (prior to shipment if appropriate) to verify completeness and accuracy.

8.11 Depending on holding time requirements (see MDNR-FSS-001 *Required/Recommended Containers, Volumes, Preservatives, Holding Times and Special Sampling Considerations*), deliver or send samples daily to the ESP Laboratory.

8.12 At the end of the survey period, remove all state-owned equipment from the facility and return the facility's equipment to its original arrangement/condition before use.

9.0 QUALITY CONTROL

9.1 As an ESP policy and according to the WPCP QAPP, collection of duplicate field samples is required on approximately 10 percent of all samples collected for NPDES compliance monitoring. The data collected from duplicate samples will be used by the ESP to evaluate analytical precision and repeatability of the field sample collection procedures (see MDNR-FSS-210 *Quality Assurance/Quality Control for Environmental Data Collection*).

9.1.1 Two sets of samples will be collected for the requested analyses: a true sample, and a duplicate field sample. The results of analyses from the first set of samples, the true sample, collected will be reported to WPCP. The results of the second set of samples, the duplicate field sample, will be evaluated in-house by the ESP to determine the repeatability of field collection methods. The duplicate samples are also used to determine the level of precision in the testing conducted by CAS.

9.1.2 A duplicate sample must be collected in the same manner as the true sample. When using multiple automatic samplers to collect the duplicate and true samples, the intake tubes must be placed in positions that will allow the samplers to collect essentially the same water (i.e. representative sample water consisting of the same chemical/physical nature). This can be accomplished by taping or clamping the intake lines together.

9.1.3 Duplicate samples will be collected at a frequency of approximately 10%. Trip blanks will be collected in accordance to MDNR-FSS-210 and will accompany every sample to be analyzed for organic parameters.

10.0 SURVEY COMPLETION AND REPORTING

10.1 Upon return from a compliance monitoring trip, return all unused supplies and equipment to the appropriate storage areas and clean all used wastewater samplers and other soiled equipment (see MDNR-FSS-201 *Use, Cleaning and Maintenance*

of ISCO Automatic Wastewater Samplers). Mark any malfunctioning equipment and notify the WQMS Supervisor of the necessary repairs.

10.2 The Environmental Specialist shall check the LIMS Viewer within a day or two following sample check-in to verify that all the information on the Chain-of-Custody was entered correctly by CAS.

10.3 All NPDES compliance monitoring results will be reported by the CAS and forwarded to the WPCP. The sample collector will receive a copy of the sample results for review. Any errors found by the Environmental Specialist should be immediately reported to the CAS so that corrections can be made.

11.0 REFERENCES

MDNR-FSS-001 Required/Recommended Containers, Volumes, Preservatives, Holding Times, and Special Sampling Considerations

MDNR-FSS-002 Field Sheet and Chain-of-Custody Record

MDNR-FSS-003 Sample Numbering and Labeling

MDNR-FSS-004 Field Documentation

MDNR-FSS-005 General Sampling Considerations Including the Collection of Grab, Composite, and Modified Composite Samples for Streams and Wastewater Flows

MDNR-FSS-018 Sample Handling: Field Handling, Transportation, and Delivery to the ESP Lab

MDNR-FSS-108 Field Analysis of Fecal Coliform Bacteria

MDNR-FSS-201 Use, Cleaning, and Maintenance of ISCO Automatic Wastewater Samplers

MDNR-FSS-210 Quality Assurance/Quality Control for Environmental Data Collection